

CENTRAL VALLEY WATER BOARD STAFF SITE VISIT WRITE-UP

City of Colusa

Wastewater Treatment Plant, Colusa County

MUN Beneficial Use Project

6 March 2012

On 6 March 2012, Anne Littlejohn and Calvin Yang, conducted a site visit of the Colusa Wastewater Treatment Plant (CWTP) and its receiving waters.. Two City of Colusa representatives, Mr. Dale Klever, Water/Wastewater Plant Manager, and Mr. Jesse Cain, Lead Utility Systems Operator, participated in the site visit.

The CWTP is located southwest of the City of Colusa (City) in Colusa County. Colusa Wastewater Treatment Plant's effluent is released into the Unnamed Tributary (Ag. Ditch), prior to its confluence with Powell Slough. Powell Slough flows into the Colusa Basin Drain (2047) after its confluence with the Unnamed Tributary. The purpose of the site visit was to conduct reconnaissance and a site survey of the area. There was no evidence of any municipal or domestic water use from the Unnamed Tributary or Powell Slough during the visit. A YSI multimeter was used to gather basic field measurements (pH, temperature, dissolved oxygen and specific conductivity) at the first three sites (*note - the meter became inoperable and could not be used for subsequent sites*).

The day of the visit started off chilly and very windy (Beaufort Scale = 6+) in the morning and remained that way for the rest of the day, despite the sunny conditions. Most of the adjacent farms produce rice crops, but the fields were still dry as it was too early for the flooding season. Drainage in the Unnamed Tributary was fairly low as was the flow in Powell Slough. The flow in the Colusa Basin Drain appeared to be normal.

The first site visited was the RSW-001U, the Unnamed Tributary upstream of effluent discharge (Photo 1). The channel had a fair amount of water, but the flow was very slow. The NPDES samples for this site are normally taken prior to the channel going under the road at the weir. City Staff indicated that the receiving water was made up of irrigation discharge and urban runoff from the City of Colusa as well as storm water during rain events. Data collected as follows:

GPS coordinates = 39.17431, -122.03136

Water Temp = 8.92 °C

pH = 7.7

Dissolved Oxygen = 6.76 mg/L

Specific Conductivity = 1379 µS/cm

Photo 1: Unnamed Tributary at the RSW-001U site, looking upstream.



City staff indicated that within the last 6-7 months (estimated at Aug-Sept 2011), an additional channel was dug by the landowner along the other side of the road, thereby adding an additional source of upstream receiving water. This channel is used for irrigation tailwater from the rice fields. The source of the water was most likely groundwater from the new wells that had been dug on the landowner's property. No water sampling has been conducted on the water from this new arm of the channel shown in Photo 2. Water was flowing in the new channel, but was low compared to the salt deposit line shown in Photo 3. Because the RSW-001U no longer represents the upstream receiving water in its entirety, a consideration should be made for adding a site to this portion of the channel for the project.

Photo 2: New Ditch, dug about 6-7 months ago, adds a second arm to Unnamed Tributary upstream of effluent discharge



Photo 3. New Ditch, white line shows the salt deposition that is already quite noticeable.



The next photograph (Photo 4) shows the location of the effluent discharge into the Unnamed Tributary. The bubbling circle in the middle of the picture indicates the effluent was actively discharging during our visit. (GPS coordinates = 39.17391,-122.031252)

Photo 4. Effluent outfall into Unnamed Tributary



The next receiving water site was RSW-001D, approximately 200 ft downstream of the effluent discharge point in the Unnamed Tributary (Photo 5). The NPDES samples are usually collected directly across from the telephone pole. Data collected as follows:

GPS coordinates = 39.171444,-122.031252

Water Temp = 13.51 °C

pH = 7.84

Dissolved Oxygen = 7.62 mg/L

Specific Conductivity = 1051 µS/cm

Photo 5. Unnamed Tributary at the RSW-001D receiving water monitoring site



Downstream from RSW-001D, several pipes for transporting water off of the rice fields into the Unnamed Tributary were located. Rice fields were still dry for this visit so no water was flowing from the pipes. Photo 6 shows the pipe located at the GPS coordinates = 39.170635,-122.031282.

Photo 6: Pipe carrying water from the rice fields to the Unnamed Tributary.



City staff indicated that a new pipe had been installed to drain the rice fields, just prior to the “bend” in the Unnamed Tributary at the GPS coordinates = 39.167154,-122.031233. Photo 7 shows it circled in red entering the Unnamed Tributary looking upstream.

Photo 7. Unnamed tributary, prior to the “bend” and its confluence with Powell Slough.



The Unnamed Tributary bends and flows under the road at the GPS coordinates = 39.16697, -122.03135. Photo 8 shows the Unnamed Tributary looking downstream towards Powell Slough after the “bend”. Another pipe from the rice fields can be seen at this location.

Photo 8. Unnamed Tributary looking downstream towards Powell Slough.



The next stop was at the confluence of the Unnamed Tributary and Powell Slough. A pipe runs under the roadway at the end of the the Unnamed Tributary and in to the slough as see in Photo 9 (GPS coordinate = 39.16683,-122.03495).

Photo 9. Pipe that contains the flow from the Unnamed Tributary in to Powell Slough



The City of Colusa's CWTP has two receiving water monitoring sites in Powell Slough in addition to the two in the Unnamed Tributary. RSW-002U is approximately 250 feet upstream from the confluence of the Unnamed Tributary and Powell Slough at a weir as shown in Photo 10. This area is blocked off from the remaining portion of Powell Slough and filled for irrigation water. Holding the water for a period of time also warms the water prior to using it on the rice fields. Data collected as follows:

GPS coordinates = 39.167805,-122.034801

Water Temp = 8.13 °C

pH = 8.78

Specific Conductivity = 2091 $\mu\text{S}/\text{cm}$

Photo 10. Powell Slough, looking downstream at the weir for the RSW-002U site



Upstream of RSW-002U on Powell Slough, the channel becomes quite large. When Powell Slough is full, the pump shown in Photo 11 is used to take water out for irrigation to the rice field (GPS coordinates = 39.173611,-122.036702).

Photo 11. Expanded area of Powell Slough north of RSW-002U. Pump is used for irrigation.



The next site was RSW-002D, approximately 400 feet downstream of the confluence with the Unnamed Tributary (GPS coordinates = 39.16553,-122.03563) as shown in Photo 12.

Photo 12. Powell Slough, 400 feet downstream from the confluence of the Unnamed Tributary



Downstream of the RSW-002U and RSW-002D sites, no water is taken from Powell Slough for irrigation but there are several other outflows from the fields. Photo 13 shows two pipes and a canal that discharge water into Powell Slough (GPS coordinates = 39.163409,-122.037764). No water from these sources was seen during this site visit.

Photo 13. Discharge from rice fields into Powell Slough, downstream of RSW-002D



Past this section of Powell Slough, the road heads east towards Colusa Basin Drain, upstream of its confluence with Powell Slough. At the end of the road, there is a pump structure (GPS coordinates = 39.162698,-122.040765), shown in Photo 14, which takes water from Colusa Basin Drain and into a ditch that runs north alongside the closest northeast field. This water is used for irrigation in the rice fields. The agricultural runoff from these fields goes back into Powell Slough.

Photo 14. Colusa Basin Drain at Pump Structure



Since the conditions were dry and no rain events had occurred recently, it was possible to continue driving southeast along Colusa Basin Drain towards its confluence with Powell Slough. City staff cautioned that this road would not be safe for supporting a vehicle during the wet season and the Powell Slough confluence area would not be safely accessible to sample. Photo 15 shows Powell Slough just upstream its confluence with Colusa Basin Drain (GPS coordinates = 39.161425,-122.038349). There is an island that causes Powell Slough to fork just prior to entering the drain. Photo 16 shows evidence of a dam that had been used on one of the Powell Slough forks before its confluence with Colusa Basin Drain.

Photo 15. Powell Slough immediately upstream of its confluence with the Colusa Basin Drain



Photo 16. Remnants of a dam on Powell Slough



Photos 17-19 show the Colusa Basin Drain upstream, at and downstream of its confluence with Powell Slough.

Photo 17. Colusa Basin Drain just upstream of the confluence with Powell Slough



Photo 18. Colusa Basin Drain at the confluence with Powell Slough



Photo 19. Colusa Basin Drain looking downstream past the confluence with Powell Slough.



City staff directed Central Valley Water Board staff to two potential sampling sites on the Colusa Basin Drain that they had sampled at in the past. The first was approximately a mile downstream of the Powell Slough confluence at a bridge overcrossing on Abel Road (GSP coordinates = 39.144631,-122.027122) as seen in Photo 20. The second was Colusa Basin Drain at Hwy 20, upstream of the Powell Slough confluence (GPS = 39.19545,-122.06132) as seen in Photo 21. The photo also shows an overflow channel (circled in red) that goes to Powell Slough when the water is high enough. Photo 22 shows a closer look at this channel. Photo 23 shows a dry ditch on the opposite side from the channel to Powell Slough on Colusa Basin Drain that discharges water during the irrigation season.

Photo 20. Colusa Basin Drain, downstream of the Powell Slough confluence at Abel Road Bridge



Photo 21. Colusa Basin Drain upstream of Powell Slough confluence at Hwy 20. The circled red area is where the over flow of the drain goes to a channel towards Powell Slough.



Photo 22. A closer look at the outflow channel to Powell Slough from the Colusa Basin Drain



Photo 23. Ditch across from the Powell Slough overflow channel in Colusa Basin Drain. Ditch was dry, but carries Ag. run off during the irrigation season.



Highway 20 also crosses the northern section of Powell Slough east of the site at the Colusa Basin Drain. Photo 24 shows Powell Slough, looking upstream. The channel from the Colusa Basin Drain to Powell Slough runs parallel to Highway 20 as shown in Photo 25. Photo 26 shows the channel at a weir, looking downstream towards Powell Slough. In the background, a sign indicates that the land is part of "Wilderness Unlimited".

Photo 24. Powell Slough at Hwy 20, looking upstream to the north.



Photo 25. Channel along Hwy 20 carrying overflow water from Colusa Basin Drain to Powell Slough, looking upstream.



Photo 26. Channel carrying overflow water from Colusa Basin Drain, looking downstream

